

CLAIMS

We claim:

- Sub A, 17  
5
1. A material handler capable of lifting a load that has a load weight, the material handler comprising:  
a frame supported for movement over the ground;  
a telescoping boom coupled to the frame, the telescoping boom being extendable between a retracted position and an extended position, and pivotable between a lowered position and a raised position;  
a boom extension sensor that generates a first signal corresponding to the distance the boom is extended;  
10 a boom angle sensor that generates a second signal corresponding to the angle the boom is pivoted; and  
a control system that displays a cursor located at a position that is based on the first signal and the second signal to indicate to the operator when the material handler  
15 is operating at a safe loading condition.
2. The material handler of claim 1, wherein the control system receives the first and second signals.
- 20 3. The material handler of claim 1, wherein the distance that the telescoping boom is extended is measured relative to the retracted position.
- 25 4. The material handler of claim 1, wherein the angle that the telescoping boom is pivoted is measured relative to the lowered position.
5. The material handler of claim 1, wherein the control system includes a screen that displays the cursor.
- 30 6. The material handler of claim 5, wherein the location of the cursor on the screen is defined by a first dimension based on the first signal and a second dimension based on the second signal.
- FOOTNOTES

The material handling system defines a first zone unsafe to operate the machine when the cursor is located within the zone.

The material handling system defines a second zone, and wherein the second zone is defined by the attachments.

The material handling system selectively adjusts the

A.

10

11. The material is a polymer that selectively adjusts its properties in response to changes in the environment.

15

~~the mat  
lary fo~~

20

Sub 20 A.17

14. A method of indicating to the operator when a material handler is operating at a safe loading condition, the material handler including a telescoping boom that is coupled to a frame, the telescoping boom being extendable between a retracted and an extended position and pivotable between a lowered and a raised position, the method comprising:

sensing the distance that the telescoping boom is extended;  
generating a first signal based on the sensed distance;  
sensing the angle that the telescoping boom is pivoted;  
generating a second signal based on the sensed angle; and  
displaying a cursor at a position based on the first signal and the second signal.

15. The method of claim 14, further comprising receiving the signals with a control system.

16. The method of claim 14, wherein sensing the distance includes sensing the distance that the telescoping boom is extended relative to the retracted position.

17. The method of claim 14, wherein sensing the angle includes sensing the angle that the telescoping boom is raised relative to the lowered position.

18. The method of claim 14, wherein displaying a cursor includes displaying a cursor on a screen.

19. The method of claim 18, wherein displaying a cursor on a screen includes displaying the cursor on the screen at a location that is defined by a first dimension based on the first signal and a second dimension based on the second signal.

20. The method of claim 14, further comprising displaying a boundary that defines a first zone in which it is safe to operate the boom and a second zone in which it is unsafe to operate the boom, the material handler being likely to tip over when the cursor is located within the second zone.

21. The method of claim 20, wherein displaying a boundary includes displaying a boundary based on a boom attachment.

22. The method of claim 21, further comprising adjusting the control system to  
5 select the boundary for a specific boom attachment.

23. The method of claim 22, wherein adjusting the control system includes adjusting a switch on the control system to select the boundary for a specific boom attachment.

10

24. The method of claim 21, wherein displaying a boundary includes displaying a boundary based on a load weight.

25. The method of claim 24, further comprising adjusting the control system to  
15 select the boundary for a specific load weight.

26. The method of claim 25, wherein adjusting the control system includes manually entering the load weight on a keypad of the control system to select the boundary for a specific load weight.

20

27. A material handler capable of lifting a load that has a load weight, the material handler comprising:

a frame supported for movement over the ground;

5 a telescoping boom coupled to the frame, the telescoping boom being extendable between a retracted position and an extended position, and pivotable between a lowered position and a raised position, the telescoping boom including a boom attachment;

A, a boom extension sensor that generates a first signal corresponding to the distance the boom is extended;

10 a boom angle sensor that generates a second signal corresponding to the angle the boom is pivoted; and

a control system that receives the first and second signals, the control system including

15 a screen that displays a boundary that defines a first zone in which it is safe to operate the boom and a second zone in which it is unsafe to operate the boom and that displays a cursor located at a position that indicates to the operator when the material handler is operating at a safe loading condition, wherein the location of the cursor on the screen is defined by a first dimension based on the first signal and a second dimension based on the second signal,

20 a switch that selectively adjusts the boundary for different boom attachments, and

a keypad that selectively adjusts the boundary for different load weights.

28. A control system for a material handler capable of lifting a load that has a load weight, the material handler including a frame supported for movement over the ground, a telescoping boom coupled to the frame, the telescoping boom being extendable between a retracted position and an extended position, and pivotable between a lowered position and a raised position, the control system comprising:

5 a boom extension sensor adapted to generate a first signal indicative of the distance the boom is extended;

A, a boom angle sensor that adapted to generate a second signal indicative of the angle the boom is pivoted;

10 a controller that determines when the material handler is operating at a safe loading condition based on the first signal and the second signal; and

a display that displays a cursor located at a position to indicate the loading condition.

136257

Add A.7